

ABSTRACT

A spherical actinometer integrates the omnidirectional radiant flux over time to obtain the radiant energy or fluence incident on the sphere utilizing a small spherical vessel containing a solution that responds to germicidal radiation but not ambient room light. In one embodiment the actinometric solution, is an aqueous mixture of iodide and iodate that is optically opaque at 254 nm but insensitive to radiation above 330 nm. The UV-induced formation of triiodide, is facilitated by the presence of iodate that acts as an electron acceptor. The formation of triiodide, which is easily measured spectroscopically with a photometer, occurs with a quantum yield of 0.75 for 254 nm radiation at 21° C. The actinometric measurement of UV fluence using the system is substantially independent of the size of the measuring device.